

Method and System for Modular Multiplexing and Amplification in a Multi-Channel Plan

Abstract

A system and method for modular multiplexing and amplification of optical signals in subwindows within an operating window of a fiber optic communication network. An operating window is divided into subwindows. Optical signals in each subwindow are optically amplified separately and in parallel by a plurality of optical line amplifiers. According to one embodiment, the operating window is divided into four subwindows within an erbium wavelength band. Each subwindow corresponds to a different group of channels having optical signals of a different wavelength. Modular wavelength division multiplexing (WDM) units multiplex/demultiplex optical signals in the set of multiple channels. A modular WDM unit includes a coarse WDM unit and four fine WDM units. The coarse WDM multiplexes optical signals by wavelength into subwindows separated by relatively large guard bands. A fine WDM unit further multiplexes optical signals within a subwindow by wavelength into individual channels with a fine separation. Fine WDM units and optical line amplifiers can be added in a modular fashion, as needed, to support actual or anticipated traffic in the corresponding subwindows and channels therefor. Dispersion magnitude and slope can be managed across channels within subwindows without expensive equalization circuits. A multi-channel plan for high-speed WDM traffic in an erbium band can be adopted and installed in a modular fashion on existing single-mode fiber networks with less initial cost and more flexible design.